WHAT IS CLAIMED IS:

1. A piezoelectric actuator unit comprising: a plurality of piezoelectric vibrators formed by alternately laminating electrode layers and piezoelectric material layers so as to vibrate in a lamination direction of said layers, wherein:

said plurality of piezoelectric vibrators are arranged in one row in a direction of vibrator arrangement perpendicular to said lamination direction, each piezoelectric vibrator includes an area on one side and an area on the other side in a vibrator width direction perpendicular to both said lamination direction and said vibrator arrangement direction, either of said area on one side and said area on the other side forms an active part capable of performing piezoelectric deformation, and the other area forms an inactive part incapable of performing piezoelectric deformation, an arrangement of said active part and said inactive part is opposite between adjacent piezoelectric vibrators, each piezoelectric vibrator has an individual electrode layer on a drive voltage input side, and all of said individual electrode layers of said plurality of piezoelectric vibrators are exposed on one side of said piezoelectric actuator unit in said vibrator width direction.

2. A piezoelectric actuator unit according to Claim 1, wherein:

said plurality of piezoelectric vibrators respectively further include common electrode layers on a reference potential side, and

all of said common electrode layers of said plurality of piezoelectric vibrators are exposed on the other side of said piezoelectric actuator unit in said vibrator width direction.

3. A piezoelectric actuator unit according to Claim 1 or 2, further comprising external drive means

configured to drive said plurality of piezoelectric vibrators, and

all of said individual electrode layers of said plurality of piezoelectric vibrators are electrically connected to said external drive means on one side of said piezoelectric actuator unit.

4. A piezoelectric actuator unit according to Claim 2 or 3, further comprising:

a plurality of individual external electrodes which are exposed on one side of said piezoelectric actuator unit and electrically connected to respective said individual electrode layers of said plurality of piezoelectric vibrators, and

a common external electrode which is exposed on the other side of said piezoelectric actuator unit and electrically connected to all of said common electrode layers of said plurality of piezoelectric vibrators,

wherein said common external electrode is pulled out on the same side as that of said individual external electrodes.

5. A piezoelectric actuator unit according to any one of Claims 1 to 4, wherein via an inactive wall incapable of performing piezoelectric deformation and extending overall in said vibrator width direction between said piezoelectric vibrators, said plurality of piezoelectric vibrators are integrally formed without being separated from each other.

6. A piezoelectric actuator unit according to any one of Claims 1 to 4, wherein:

respective said plurality of piezoelectric vibrators are formed independently, and

said plurality of piezoelectric vibrators are integrally fixed by a fixing substrate arranged on one side of said actuator unit in the lamination direction.

7. A piezoelectric actuator unit according to Claim 6, wherein said fixing substrate is formed by free-

cutting ceramics.

8. A piezoelectric actuator unit according to Claim 6 or 7, further comprising a piezoelectric actuator unit substrate for holding said fixing substrate.

9. A piezoelectric actuator unit according to Claim 8, further comprising a tape carrier package electrically connected to said electrode layers of said plurality of piezoelectric vibrators, wherein said tape carrier package includes an integrated circuit for driving said plurality of piezoelectric vibrators, and a rear of said integrated circuit is at least partially fixed to said piezoelectric actuator unit substrate.

10. A method of manufacturing a piezoelectric actuator unit structured by arranging a plurality of piezoelectric vibrators formed by alternately laminating electrode layers and piezoelectric material layers so as to vibrate in a lamination direction of said layers, comprising:

a lamination step of forming a laminate by alternately laminating a first conductive material layer for forming common electrode layers of said plurality of piezoelectric vibrators on a reference potential side and a second conductive material layer for forming individual electrode layers of said plurality of piezoelectric vibrators on a drive voltage input side while sandwiching a piezoelectric material layer between said first conductive material layer and said second conductive material layer, wherein:

in said first conductive material layer, a plurality of first windows are formed so as to be arranged at a predetermined pitch to form a first window row along said vibrator arrangement direction,

in said second conductive material layer, a plurality of second windows are formed so as to be arranged at said predetermined pitch to form a second window row parallel with said first window row, and

said first windows and said second windows are staggered from each other at a pitch which is a half of said predetermined pitch in said vibrator arrangement direction.

11. A method of manufacturing a piezoelectric actuator unit according to Claim 10, further comprising a step of joining a fixing substrate to one face of said laminate in said lamination direction.

12. A method of manufacturing a piezoelectric actuator unit according to Claim 11, further comprising:

a step of forming a second external conductive material layer to be connected to said second conductive material layer on one face of said laminate in a vibrator width direction perpendicular to said lamination direction and said vibrator arrangement direction, and

a step of forming a first external conductive material layer to be connected to said first conductive material layer on the other face of said laminate in said vibrator width direction and pulling out and extending said first external conductive material layer up to one face of said laminate in which said second external conductive material layer is formed passing through a face of said fixing substrate opposite to a face of said fixing substrate to which said laminate is joined.

13. A method of manufacturing a piezoelectric actuator unit according to any one of Claims 10 to 12, further comprising a step of forming a plurality of notches in said laminate in said lamination direction, thereby forming said plurality of piezoelectric vibrators, each of said plurality of notches being formed so as to cover both each end of said first windows and each end of said second windows in said vibrator arrangement direction.

14. A method of manufacturing a piezoelectric

actuator unit according to any one of Claims 10 to 12, wherein said first conductive material layer or said second conductive material layer is also formed on an end face of said laminate corresponding to tips of said plurality of piezoelectric vibrators.

15. A method of manufacturing a piezoelectric actuator unit according to any one of Claims 10 to 14, further comprising a step of electrically connecting external drive means configured to drive said plurality of piezoelectric vibrators to all of said individual electrode layers of said plurality of piezoelectric vibrators on one face of said laminate.

16. A piezoelectric structural body used for manufacturing a piezoelectric actuator unit structured by arranging a plurality of piezoelectric vibrators formed by alternately laminating electrode layers and piezoelectric material layers so as to vibrate in a lamination direction of said layers, comprising:

a laminate formed by alternately laminating a first conductive material layer for forming common electrode layers of said plurality of piezoelectric vibrators on a reference potential side and a second conductive material layer for forming individual electrode layers of said plurality of piezoelectric vibrators on a drive voltage input side while sandwiching a piezoelectric material layer between said first conductive material layer and said second conductive material layer, wherein:

in said first conductive material layer, a plurality of first windows are formed so as to be arranged at a predetermined pitch to form a first window row along said vibrator arrangement direction, and

in said second conductive material layer, a plurality of second windows are formed so as to be arranged at said predetermined pitch to form a second window row parallel with said first window row, and

said first windows and said second windows are staggered from each other at a pitch which is a half of said predetermined pitch in said vibrator arrangement direction.

17. A piezoelectric structural body according to Claim 16, further comprising a fixing substrate joined to one face of said laminate in said lamination direction.

18. A piezoelectric structural body according to Claim 17, further comprising:

a second external conductive material layer which is formed on one face of said laminate in a vibrator width direction perpendicular to said lamination direction and said vibrator arrangement direction and connected to said second conductive material layer, and

a first external conductive material layer which is formed on the other face of said laminate in said vibrator width direction and connected to said first conductive material layer and pulled out and extended up to one face of said laminate in which said second external conductive material layer is formed passing through a face of said fixing substrate opposite to a face of said fixing substrate to which said laminate is joined.

19. A piezoelectric structural body according to any one of Claims 16 to 18, wherein by a plurality of notches formed in said laminate in said lamination direction, said plurality of piezoelectric vibrators are formed, and said plurality of notches are respectively formed so as to cover both each end of said first windows and each end of said second windows in said vibrator arrangement direction.

20. A piezoelectric structural body according to any one of Claims 16 to 19, wherein said first conductive material layer or said second conductive material layer is also formed on an end face of said laminate

corresponding to tips of said plurality of piezoelectric vibrators.

21. A piezoelectric structural body according to any one of Claims 16 to 20, further comprising external drive means configured to drive said plurality of piezoelectric vibrators and connected to all of said individual electrode layers of said plurality of piezoelectric vibrators on one face of said laminate.

22. A liquid ejecting apparatus including a liquid ejecting head having a nozzle forming face in which a plurality of nozzle openings for ejecting liquid drops are formed in line at a predetermined pitch, wherein:

said liquid ejecting head has a plurality of pressure chambers respectively interconnected to said plurality of nozzle openings, a plurality of elastic walls forming one face of each of said plurality of pressure chambers, and a piezoelectric actuator unit configured to deform said elastic walls to change volume of said pressure chambers,

said plurality of nozzle openings and said plurality of pressure chambers are arranged in a first row and a second row which are parallel with each other, and said nozzle openings and said pressure chambers belonging to said first row and said nozzle openings and said pressure chambers belonging to said second row are staggered from each other at a pitch which is a half of said predetermined pitch, and

said piezoelectric actuator unit has a plurality of piezoelectric vibrators arranged in one row at a pitch which is a half of said predetermined pitch in correspondence with said plurality of pressure chambers, said plurality of piezoelectric vibrators respectively include active parts capable of performing piezoelectric deformation corresponding to said pressure chambers belonging to said first row or said second row and inactive parts incapable of performing piezoelectric

deformation corresponding to partitions for isolating said pressure chambers belonging to said second row or said first row, an arrangement of said active part and said inactive part is opposite between adjacent piezoelectric vibrators, and said piezoelectric vibrators respectively have an individual electrode layer on a drive voltage input side, and all of said individual electrode layers of said plurality of piezoelectric vibrators are exposed on one side of said piezoelectric actuator unit in said vibrator width direction.

23. A liquid ejecting apparatus according to Claim 22, wherein said piezoelectric vibrators are formed by laminating piezoelectric material layers and electrode layers perpendicularly to said nozzle forming face, and said piezoelectric vibrators vibrate in an lamination direction of said piezoelectric material layers and said electrode layers.

24. A liquid ejecting apparatus according to Claim 23, wherein all of said plurality of piezoelectric vibrators and an external drive source are electrically connected on one side of said piezoelectric actuator unit.

25. A liquid ejecting apparatus according to any one of Claims 22 to 24, further comprising:

a plurality of said piezoelectric actuator units, and

a plurality of sets composed of said first row and said second row formed by said plurality of nozzle openings and said plurality of pressure chambers,

wherein said piezoelectric actuator unit is arranged in each of said sets composed of said first row and said second row.

26. A liquid ejecting apparatus according to any one of Claims 22 to 25, wherein:

said plurality of elastic walls are composed of a

part of an elastic plate covering all of said plurality of pressure chambers, and

a face of said elastic plate on a side of said piezoelectric actuator unit is joined only to said piezoelectric actuator unit around each of said plurality of elastic walls.

27. A liquid ejecting apparatus according to Claim 26, wherein a plurality of insular movable thick parts which are respectively formed in correspondence with said plurality of pressure chambers and to which respective said active parts of said plurality of piezoelectric vibrators are joined and a plurality of insular fixed thick parts which are formed in correspondence with said partitions for isolating said plurality of pressure chambers and to which respective said inactive parts of said plurality of piezoelectric vibrators are joined are installed on said face of said elastic plate on said side of said piezoelectric actuator unit.

28. A liquid ejecting apparatus according to Claim 26, wherein a plurality of insular movable thick parts which are respectively formed in correspondence with said plurality of pressure chambers and to which respective said active parts of said plurality of piezoelectric vibrators are joined, a plurality of peninsular fixed thick parts which are formed in correspondence with said partitions for isolating said plurality of pressure chambers and to which respective said inactive parts of said plurality of piezoelectric vibrators are joined, first thick bases for connecting said peninsular fixed thick parts corresponding to said first row, and second thick bases for connecting said peninsular fixed thick parts corresponding to said second row are installed on said face of said elastic plate on said side of said piezoelectric actuator unit.

29. A liquid ejecting apparatus according to Claim

28, wherein said first thick bases and said second thick bases are arranged on a side opposite to a side where said nozzle openings are formed with respect to said pressure chambers.

30. A liquid ejecting apparatus according to any one of Claims 27 to 29, wherein a length of said insular fixed thick part or said peninsular fixed thick part formed in correspondence with said partition is longer than a length of said insular movable thick part formed in correspondence with said pressure chamber.

31. A liquid ejecting apparatus according to any one of Claims 27 to 30, wherein:

said elastic walls have parts corresponding to said insular movable thick parts and compliance parts formed around said insular movable thick parts, and

an outer contours of said compliance part, in an arrangement direction of said plurality of nozzle openings, are defined by said insular fixed thick parts or said peninsular fixed thick parts formed in correspondence with said partitions and, in a direction perpendicular to the arrangement direction of said plurality of nozzle openings, are defined by a part of side walls forming said pressure chambers and ink feed ports of said pressure chambers.

32. A liquid ejecting apparatus according to any one of Claims 22 to 31, wherein said piezoelectric vibrators are formed by laminating piezoelectric material layers and electrode layers perpendicularly to said nozzle forming face, said piezoelectric vibrators vibrate in a lamination direction of said piezoelectric material layers and said electrode layers, and via an inactive wall incapable of performing piezoelectric deformation extending overall in said vibrator width direction between said piezoelectric vibrators, said plurality of piezoelectric vibrators are integrally formed without being separated from each other.